OUT54514

T O P S E C R E T 231802Z

PRIORITY [redacted] 3343

[redacted] CORONA

REF: MEETING HELD AT THE REQUEST OF [redacted] ON 13 NOVEMBER BETWEEN [redacted] TO DISCUSS THE REQUIREMENTS FOR A STELLAR/INDEX CAMERA IN THE [redacted] SYSTEM.

1. PER [redacted] REQUEST AT CLOSE OF REFERENCE MEETING THE FOLLOWING IS A SUMMATION OF THE DISCUSSION PERTAINING TO [redacted] REQUIREMENTS FOR A SOURCE OF ACCURATE ATTITUDE DATA IN THE [redacted] SYSTEM. THE S/I CAMERA IS CURRENTLY THE ONLY MEANS FOR OBTAINING THIS DATA.

2. DATA FROM THE S/I CAMERA IS NEEDED BY [redacted] IN ANSWERING PROJECT REQUIREMENTS, AS A FACTOR IN QUALITY CONTROL, AND TO NEGATE OR CONTROL THE ACCUMULATION OF ATTITUDE ERRORS FOR MENSURATION PURPOSES.

A. PROJECTS INVOLVING MENSURATION OF MISSILES, AIRCRAFT, ATOMIC ENERGY INDUSTRY, LAUNCHING PADS, RADAR INSTALLATIONS, ETC. REQUIRE ANSWERS THAT MUST BE AS ACCURATE AS POSSIBLE. IN EVERY ONE OF THE ABOVE TYPES OF MEASUREMENTS IT IS NECESSARY TO CONSIDER AND TRY TO ELIMINATE ALL ERRORS, INCLUDING THE PITCH, ROLL, AND

[redacted]

25X1

HFS 25X1
WCB 25X1
CFC 25X1
PNS 25X1
ACL 25X1
-01 25X1 LES-
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YAW THAT AFFECT THE FINAL RESULTS.

B. [redacted] HAS A REQUIREMENT THAT INVOLVES DETERMINING THE GEOGRAPHIC LATITUDE AND LONGITUDE OF SELECTED OBJECTS TO THE ACCURACY OF THE EPHEMERIS. IN ORDER TO COMPLY WITH THIS REQUEST IT IS NECESSARY THAT THE PITCH, ROLL, AND YAW BE BETTER THAN THAT AVAILABLE FROM THE [redacted] SYSTEM'S ATTITUDE SENSORS; THAT IS THE ATTITUDE DETERMINED FROM TELEMETRY AND REPORTED IN THE MCD. 25X1 25X1

C. THE PET TEAM HAS REQUESTED THAT [redacted] PROVIDE ATTITUDE ON A TIMELY BASIS AND BARGE ENGINEERS HAVE ALSO INDICATED AN INTEREST IN THE ACTUAL ATTITUDE TO ASSIST THEM IN SYUDYING VEHICLE AND ATTITUDE SENSOR PERFORMANCE, ETC. 25X1

D. IT IS OCCASIONALLY NECESSARY THAT [redacted] HAVE SPECIAL PURPOSE LARGE SCALE MAPS PREPARED. THE ACCURACY OF THE MAP IS DEFINITELY DEPENDENT ON THE ACCURACY OF THE INPUTS, THE MOST IMPORTANT BEING ACCURATE PITCH, ROLL, AND YAW. 25X1

E. [redacted] IS RESPONSIBLE FOR THE DETERMINATION AND DISTRIBUTION OF ATTITUDE DATA TO OTHER COMPONENTS OF THE INTELLIGENCE COMMUNITY WHO RELY ON THE DATA REDUCED AT [redacted] FOR THE SOLUTION OF THEIR OWN PARTICULAR PROBLEMS. 25X1 25X1

3. AS A FACTOR IN OVERALL QUALITY CONTROL THE S/I DATA, ONCE THE S/I CAMERAS BECOME RELIABLE, WILL BE OF INVALUABLE AID FOR THE FOLLOWING REASONS:

A. WITH ACCURATE INPUTS TO THE SOLUTION OF A MENSURATION PROBLEM THERE WILL RESULT AN ELEMENT OF AGREEMENT BETWEEN COMPONENTS OF THE INTELLIGENCE COMMUNITY IN THE FINAL ANSWERS FORWARDED TO HIGHER AUTHORITY WHERE AGREEMENT WITHING THE COMMUNITY

IS MANDATORY. WHEN ACCURATE INPUTS ARE NOT AVAILABLE VARIOUS SUBSTITUTE MEANS MUST BE RESORTED TO, OFTEN RESULTION IN DISAGREEMENT IN OBJECT DIMENSIONS AND NECESSITATING TIME-CONSIMING RE-EVALUATIONS AND COMPROMISES IN ORDER TO REACH AGREEMENT.

B. A MEANS OF DETERMINING THE VALIDITY OF OTHER DATA. TO DETERMINE THE ATTITUDE OF THE MAIN CAMERA SYSTEM THE ABSOLUTE ATTITUDE OF THE S/I CAMERA IS FIRST REDUCED, THEN BY THE TECHNIQUE OF RELATIVE ORIENTATION THE ATTITUDE PARAMETERS ARE TRANSFERRED TO THE MAIN CAMERA. IN THE CORONA SYSTEM THE TECHNIQUE OF RELATIVE ORIENTATION HAS PROVEN TO BE AN IMPORTANT QUALITY CONTROL FACTOR IN THAT, IF THERE IS DISAGREEMENT IN ATTITUDE PARAMETERS AFTER APPLYING THE RELATIVE ORIENTATION VALUES, IT BECOMES IMMEDIATELY APPARENT THAT THERE IS AN ERROR IN OTHER DATA. THIS PROCEDURE HAS UNCOVERED ERRORS IN THE TRANSMISSION OF DATA IN CABLES, FAULTY OR GARBLED REDUCTION OF CALIBRATION INFORMATION, AN UNSATISFACTORY EPHEMERIS, ERRONEOUS TIME, MISTAKEN SIGNS IN COMPUTER INPUTS, ETC.

4. AT PRESENT [redacted] IS UNDERGOING AN EXTENSIVE ERROR ANALYSIS THAT IS TO ENCOMPASS ALL CAMERA SYSTEMS. THE NEED FOR THIS ERROR ANALYSIS STEMS FROM A REQUIREMENT LEVIED BY THE PHOTO INTERPRETERS WHO DEMAND PRECISE MEASUREMENTS ACCOMPANIED WITH AN ACCURACY STATEMENT. ONE OF THE MORE IMPORTANT FACTORS IN THIS ERROR ANALYSIS IS THE NECESSITY OF DETERMINING THE ERROR DUE TO PITCH, ROLL, AND YAW SINCE TELEMETRY DATA IS NOT CONSISTENT. A MORE RELIABLE SOURCE, SUCH AS THE S/I CAMERAS, MUST BE UTILIZED TO PROVIDE ATTITUDE SUBJECT TO MEANINGFUL ANALYSIS.

STAT

5. [redacted] BELIEVES THAT ALL SOURCES OF ERRORS SHOULD BE MINIMIZED. BELOW IS A PARTIAL LISTING OF THE SOURCES OF ERRORS. THESE ERRORS TEND TO ACCUMULATE. 25X1

A. THE ATTITUDE OF THE CAMERA AT THE INSTANT OF EXPOSURE (ALTITUDE, PITCH, ROLL, AND YAW).

B. THE DYNAMIC MOTIONS OF THE CAMERA SYSTEM.

C. EPHEMERIS DATA.

D. SCAN RATES, FILM SPEED RATES, AND RESIDUAL IMC ERRORS.

E. EARTH CURVATURE, REFRACTION, AND CORIOLIS.

F. CALIBRATION INFORMATION, I.E., PRECALIBRATED ANGULAR RELATION-SHIPS, AND THE INTERIOR ORIENTATION OF THE CAMERA.

G. DIMENSIONAL STABILITY OF THE FILM.

H. INSTRUMENT ERRORS, I.E., THOSE INTRODUCED BY THE MEASURING ENGINE OR RECTIFICATION SYSTEMS.

I. TIME.

J. THE MATHEMATICAL MODEL OF THE PERSPECTIVE TRANSFORMATION EQUATIONS AND THE COMPUTER PROGRAM.

K. HUMAN ERRORS INTRODUCED BY THE OBSERVER.

6. TO DATE, CONFIDENCE IN THE ACCURACY OF MEASUREMENTS OBTAINED FROM [redacted] SYSTEM PHOTOGRAPHY, DESIGNED TO PROVIDE TECHNICAL INTELLIGENCE, HAS BEEN REDUCED DUE TO THE LACK OF ACCURATE ATTITUDE DATA. 25X1

T O P S E C R E T

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